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PATENT APPLICATION

Grape Plant named RS-3

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LATIN NAME OF GENUS AND SPECIES CLAIMED

[01] Interspecific variety of *Vitis champinii* x (*Vitis riparia* x *Vitis rupestris*)

VARIETY DENOMINATION

[02] The name of the variety claimed is "RS-3."

BACKGROUND OF THE INVENTION

[03] The invention relates to a new and distinct variety of the *Vitis L.* with broad nematode resistance.

[04] The new variety is the result of an interspecific cross of the grape varieties "Ramsey" (*Vitis champinii*) and "Schwarzmann" (*Vitis riparia* x *Vitis rupestris*).

BRIEF SUMMARY OF THE INVENTION

[05] The present invention provides a novel grape having the characteristics described and illustrated herein. The grape variety, RS-3, exhibits broad resistance to nematodes and can be used as a rootstock.

BRIEF DESCRIPTION OF THE DRAWINGS

[06] Figure 1 illustrates a close-up photo of the RS-3 shoot tip.

[07] Figure 2 illustrates a two-node section of primary shoot (upper, exposed side of mid shoot) with leaves attached (far right), section of primary shoot (lower, non-exposed side)(far left), and lateral shoot from the same portion of the primary shoot (center of photo).

[08] Figure 3 illustrates an upper (left) and lower (right) sides of leaves from a primary RS-3 shoot.

[09] Figure 4 illustrates a RS-3 trailing shoot attached to a trellis wire.

DETAILED DESCRIPTION OF THE INVENTION

[10] RS-3 exhibits resistance to all known aggressive populations of root knot nematode (Anwar, S. and M. McKenry. *Nematropica* 30 (1):9-17 (2000)). Its resistance

to ring nematode is slightly less than RS-2, but it also exhibits useful resistance to X. index, and root lesion, *Pratylenchus vulnus*. RS-3 is slightly susceptible to citrus nematode, *Tylenchulus semipenetrans*.

[11] The resistance levels of RS-3, RS-2, Teleki 5C and Ramsey rootstocks to populations of *Meloidogyne incognita* R3, *M. chitwoodi,* mixed *Meloidogyne* spp., *Meloidogyne* sp. pt. Ramsey and two resistance-breaking populations of *M. arenaria* were compared in microplots. Freedom and Harmony rootstocks were also included as commercially resistant checks and Cabernet Sauvignon was included as a susceptible check. Each replicate was inoculated by adding field soil containing each nematode population. The level of resistance was determined by comparing final population levels of J2 in soil and number of females and eggs per gram of root over the last two years. All rootstocks suppressed reproduction of the common *Meloidogyne* spp., however only RS-3 and RS-2 suppressed reproduction by the two resistance-breaking populations of *M. arenaria*. *See*, Tables 1-2. These data indicate that RS-3 exhibits a more durable root-knot resistance than commercially available rootstocks.

Table 1. Reproduction (eggs / g root) of six root-knot nematode populations on roots of seven grape rootstocks.

Rootstocks	*M. arenaria** pt. Freedom	*M. arenaria* pt. Harmony	*Meloidogyne* spp. pt. Ramsey	*M. incognita*	Mixed *Meloidogyne* spp.	*M. chitwoodi*
Cabernet Sauvignon	2431a	479a	2239a	288a	239a	7abc
Ramsey	522a	486a	10bc	4b	6b	148ab
Teleki-5C	1135a	98a	43b	14b	25ab	322a
Freedom	1176a	748a	1c	8b	1b	119ab
Harmony	247a	35ab	3bc	1b	2b	38abc
RS-2	213a	45ab	1bc	1b	4b	6abc
RS-3	92ab	1b	2bc	1b	4b	15abc

* Statistical analysis based on Log (n + 1) transformed data. Back transformed means are shown.

Means of three replications. Means within a column followed by the same letter are not significantly different at P = 0.05.

Mixed *Meloidogyne* spp. includes *M. incognita, M. arenaria* and *M. javanica.*

Table 2. Reproduction (J2 / 250 cm^3 soil) of five root-knot nematode populations on roots of nine grape rootstocks.

Rootstocks	*M. arenaria** pt. Freedom	*M. arenaria* pt. Harmony	*Meloidogyne* spp. pt. Ramsey	Mixed *Meloidogyne* spp.	*M. chitwoodi*
Cabernet Sauvignon	298a	78a	650a	1035a	596a
Ramsey	180a	10abc	6b	3bc	3bc
Freedom	87ab	42ab	6b	2bc	5bc
Teleki 5c	52ab	15abc	11b	2bc	9b
RS-2	39ab	30ab	5b	2bc	2bc
RS-3	10bc	3bc	5b	5bc	43b

* Statistical analysis based on Log (n + 1) transformed data. Back transformed means are shown.

Means of three replications. Means within a column followed by the same letter are not significantly different at P = 0.05.

Mixed *Meloidogyne* spp. includes *M. incognita, M. arenaria* and *M. javanica.*

[12] RS-3 generally imparts slightly less scion vigor than RS-2, its sibling. In sandy, frequently-irrigated soils, RS-3 imparts 2/3 the vigor and yield of variety Freedom. The full range of soil and climate preference of RS-3 is unknown.

[13] A botanical description of the RS-3 is provided below based on observations and measurements made during the period of April 10 to August 1, 2003 at the University of California Kearney Agricultural Center, 9240 S. Riverbend Avenue, Parlier, CA 93648 (Riverbend Avenue, between Manning and Dinuba Avenues, Fresno County). Color terminology used in the following description is based on the scheme described in Aloy, John Maerz and M. Rea Paul. A dictionary of color, 2nd edition. McGraw-Hill Book Co., New York, 1950. Descriptors for the guidelines for GRAPEVINE (*Vitis*. L), International Union for the Protection of New Varieties of Plants, Geneva, Switzerland are provided.

Vine:

[14] Very vigorous, horizontal in attitude (U.P.O.V. – 6.1.5/5), climbing readily on support wires. Bud burst early (U.P.O.V – 7.1.2/3).

Shoots:

[15] *Shoot tip.* Closed (U.P.O.V. – 6.1.1/1), globular, downy white.

[16] *Young leaves.* Light yellowish-green (U.P.O.V – 6.1.16/1)(Plate 20, H-5) with white (U.P.O.V. – 6.1.2/1), medium dense prostrate hairs (U.P.O.V. – 6.1.3/5)

[17] *Internodes.* Red (Plate 4, F-2) with green stripes on the exposed, dorsal side (U.P.O.V. – 6.1.6/2) and green with few red stripes on the ventral side (U.P.O.V. – 6.1.7/2) in the spring, becoming light pink in midsummer on the dorsal side and light green on the ventral side. Sparse prostrate hairs (U.P.O.V. – 6.1.11/1). Relief of surface is striate. Length ranges between 11 and 16 cm, averaging 12.45 cm. Width ranges between 5 and 7 mm, averaging 6.2 mm.

[18] *Nodes.* Coloration is similar to internodes (U.P.O.V. – 6.1.8/2 and U.P.O.V. – 6.1.9/2). Width ranges between 7 and 10 mm, averaging 9.2 mm. Buds average in size, not prominent.

Tendrils:

[19] Intermittent, 0-0-2-0-2-0-2 (U.P.O.V. – 6.1.14/1). Mostly red (more so at tips) with some green in the spring; becoming pinkish green in midsummer. Forked. Length is long, ranging between 12 and 21 cm, averaging 17.46 cm (U.P.O.V. – 6.1.15/7). Width ranging between 1 and 2 mm, averaging 1.5 mm.

Flowers:

[20] Male with reflex stamens and no gynoecium (U.P.O.V. – 6.2.1/1 and 4). Flower clusters range in length between 4.5 and 12 cm.

Leaves, blades:

[21] *Shape:* Reniform (U.P.O.V. – 6.1.22/5), almost entire (U.P.O.V. – 6.1.23/1). Open, U shaped petiolar sinus (U.P.O.V. – 6.1.30/3) without exposed veins (U.P.O.V. – 6.1.32/1).

[22] *Size:* Large (U.P.O.V. – 6.1.21/7). Length ranging between 12 and 15.5 cm, averaging 13.5 cm. Width ranging between 12 and 16 cm, averaging 13.8 cm.

[23] *Appearance:* Upper surface is glabrous and medium green (Plate 21, H-6). The light, yellowish green veins are prominent, with reddish-pink color on basal 1/3 of the main veins, becoming faint on midsummer growth (U.P.O.V. – 6.1.24/3). Lower surface is glabrous (U.P.O.V. – 6.1.23/1) and yellowish green (Plate 20, G-4) with sparse, prostrate hairs on the veins (U.P.O.V. – 6.1.38/3). Contour is flat (U.P.O.V. – 6.1.25/1). Surface is bullate (U.P.O.V. – 6.1.26/5).

[24] *Dentation:* teeth wide, short (U.P.O.V. – 6.1.28/3), pointed with straight sides (U.P.O.V. – 6.1.27/2). P = 0.33 (height/width) (U.P.O.V. – 6.1.27/3).

Leaves, petioles:

[25] Red on dorsal (exposed) side and red with green stripes on ventral side, becoming pink on midsummer growth. Sparse, prostrate hairs. Length ranges between 5 and 8 cm, averaging 6.7 cm; width is 3 mm (U.P.O.V. – 6.1.40/2).

Canes (mature shoots):

[26] Lignified, mature shoots in late summer and fall are medium reddish-brown (U.P.O.V. – 6.1.42/4) with obvious striations (U.P.O.V. – 6.1.41/3) in the internodes. About every 4th striation is dark brown, often resulting in 5 to 7 obviously darker striations per internode.

[27] For purposes of comparison, a similar analysis of parents Schwarzmann and Ramsey performed at the USDA collection at California State University, Fresno. The following is a result of that analysis:

RAMSEY ROOTSTOCK

Vine:

[28] Vigorous, dense growth; upright in attitude.

Shoots:

[29] *Shoot tip.* Half open, felty white.

[30] *Young leaves.* Light, yellowish-green. Medium, prostrate hairs on upper surface. Medium, prostrate hairs on lower surface, especially on the veins and the petiole.

[31] *Internodes*. Light, yellowish-green. Medium, white tufted hairs or tomentum. Medium in length; small to medium in diameter. Relief of surface is slightly striate.

[32] *Nodes*: Coloration is similar to internodes. Fewer hairs than on internodes. Buds average in size, not prominent.

Tendrils:

[33] Intermittant, 0-0-2-0-2-0-2. Small to medium long and fine; bifurcated. Light, yellowish-green.

Flowers:

[34] Female. Small, compact clusters of medium-small black berries.

[35]

Leaves, blades:

[36] *Shape:* Reniform to almost round, slightly 3-lobed. Petiolar sinus deep, open U-shaped.

[37] *Size*: Medium to medium-small

[38] *Appearance:* Upper surface medium dark green with light, prostrate hairs. Lower surface medium green with light green veins and moderate tufted tomentum. Contour is flat. Surface is smooth.

[39] Dentation: teeth uniform, straight-sided to slightly concave, shallow and distinct.

Leaves, petioles:

[40] Light, yellowish-green with tufted tomentum. Medium in length.

Canes (mature shoots):

[41] Lignified, mature shoots in late summer and fall are brown with some darker striations in the internodes. Numerous short to medium lateral shoots are present.

[42] Notable differences between RS-3 and Ramsey include:

RS-3 has horizontal vines whereas Ramsey has vines upright in attitude.

Shoot tips of RS-3 are typically closed whereas those of Ramsey are half open.

The flowers of RS-3 are male whereas the flowers of Ramsey are female.

The leaf blades of RS-3 are large whereas those of Ramsey are medium to medium-small.

SCHWARZMANN ROOTSTOCK

Vine:

[43] Vigorous, horizontal in attitude, climbing readily on support wires.

Shoots:

[44] *Shoot tip.* Closed, shiny green.

[45] *Young leaves.* Light, yellowish-green. Upper surface glabrous. Sparse, white, prostrate hairs on the petiole and the main veins on the lower surface.

[46] *Internodes.* Light, yellowish-green with violet-red and green stripes on the upper side. The red coloration becomes more faint in mid to late summer growth. Very sparse, white prostrate hairs. Medium in length and diameter. Relief of surface is slightly striate.

Nodes: Coloration is similar to internodes. Glabrous. Buds average in size, not prominent.

Tendrils:

[47] Intermittant, 0-0-2-0-2-0-2. Fairly long and fine, bifurcated. Light, yellowish-green with violet-red coloration, especially on the branches.

Flowers:

[48] Male.

Leaves, blades:

[49] *Shape:* orbiculo-reniform, entire or slightly 3-lobed. Petiolar sinus wide U-shaped.

[50] *Size*: Large

[51] *Appearance:* Upper surface is glabrous and medium dark green. Lower surface is glabrous and medium light green with short hairs in the veins. Occasional light pink coloration on the main veins at the petiolar junction. Contour is flat. Surface is slightly bullate with more puckering at the petiolar junction. Dentation: teeth irregular, slightly convex, medium large and sharply pointed.

Leaves, petioles:

[52] Light, yellowish-green with light red coloration, especially on the upper side. The coloration is more faint in mid and late summer growth.

Canes (mature shoots):

[53] Lignified, mature shoots in late summer and fall are medium reddish-brown with striations in the internodes. Strong and long lateral shoots are present under high vigor conditions.

[54] Notable differences between RS-3 and Schwarzmann include:
RS-3 has downy white shoot tips whereas those of Schwarzmann are yellowish-green.
RS-3 has teeth on the leaves that are short, whereas those of Schwarzmann are medium-large.